

CLAIMS

1. A system to transfer fluid via at least one pipeline from one structure to another structure (such as a platform (P) and a vessel (V) respectively), in which one of the structures has an offloading arm (5) which is movable in two planes perpendicular to each other and in which a part of the offloading arm remote from the one structure is engagable with the other structure, so to allow linear and rotational movements between the structures, characterised in that at least a part of the pipeline along the offloading arm, remote from the one structure is attached to the offloading arm by means of at least one support moveable lengthwise relative to the offloading arm (5), and this part of the pipeline includes at least a first pipeline section (13) configured to compensate for movements between the two structures in the longitudinal direction of the offloading arm.
2. A system according to claim 1, characterised in that the first pipeline section is configured with V-shaped rigid pipelines (13a) connected by swivel joints.
3. A system according to claim 2, characterised in that the V-shaped rigid pipelines connected by swivel joints are inverted and running in a generally vertical plane, generally parallel to the offloading arm.
4. A system according to claim 1, characterised in that the first pipeline section (13b) is configured as a spiral with the axis of the spiral extending generally parallel with the longitudinal direction of the offloading arm, and where the spiral pipeline is capable of sustaining a spiral shape under the combined weight of the pipeline and fluid within the pipeline.
5. A system according to any one of the preceding claims, characterised in that the part of the pipeline also includes at least a second rigid pipeline section connected to supports moveable lengthwise relative to the offloading arm.
6. A system as claimed in one of the preceding claims, characterised in that at least one of the supports is a wheel mounted trolley (15) arranged for movement lengthwise relative to the offloading arm (5).
7. A system as claimed in one of the preceding claims, characterised in that the part of the pipeline remote from the one structure and engagable with the other structure is itself connected to or part of another support (14) moveable lengthwise relative to the offloading arm.
8. A system as claimed in one of the preceding claims, characterised in that the pipeline is connected to the respective structures by joints (9) capable of

accommodating angular and rotational movement between the pipeline and the respective structure.

5 9. A system as claimed in one of the preceding claims, characterised in that the pipeline is connected to one of the respective structures by a hinge joint (9) and to the other of the respective structures by a universal joint (18).

10. A system as claimed in any one of the preceding claims, characterised in that the pipeline has at least one joint (10) arranged to compensate for thermal expansion and contraction relative to the offloading arm and/or either or both of the structures, whereby to allow optimum alignment of adjacent lengths of pipeline.

10 11. A system as claimed in any one of the preceding claims, characterised in that there are a plurality of pipelines (13) extending between the structures.

12. A system as claimed in any one of the preceding claims, characterised in that a joint between the offloading arm and the other of the structures is formed as a pin (19) downwardly dependant from the offloading arm, and rotatable
15 about a vertical axis in a receptacle (21) on the other of the structures.

13. A system as claimed in any one of the preceding claims, characterised in that tension (23) is applied between the other structure and the part of the offloading arm engagable with that other structure, so to resist separation of the loading arm (5) and the other structure.

20 14. A method of transferring fluid from one structure to another structure (such as a platform (P) and a vessel (V) respectively) in which one of the structures has an offloading arm (5) which is movable in a vertical plane about a horizontal axis (4) and which is also rotatable about a vertical axis (3), and which comprises the steps of arranging a part of the offloading arm to engage with the other structure, so to
25 allow linear and rotational movement between the structures, characterised in that the method includes the step of suspending a pipeline (13) having a section configured to allow movement lengthwise of the offloading arm on or from the offloading arm (5) between the structures.